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SOME METHODS OF LABELLING AND HOUSING LARGE INSECT COLLECTIONS.

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The Iowa Insect Survey has, for more than ten years, been studying the seasonal and geographic distribution of Iowa insects. The records are card indexed and come from various sources, chief of which is the survey collection made up by frequent collecting trips covering the entire state. In this way at least some preliminary work has been done in each of the 99 counties of Iowa. Many of these counties have been rather thoroughly worked for special groups.

The work is being done as a departmental project. Scores of students are engaged annually in doing the collecting and in working on the survey collection and records. New determinations are made or checked by specialists but the project is made a means of training systematic entomologists. Since the collection and records are available for use of so many, a scheme of housing and labelling which will keep all the specimens of a species and their records in definite places, where they can be readily located and as easily returned to their proper place by any of these workers, is necessary. It was found that these working conditions demanded a more harmonious marking of all the units than is employed by many of the large collections.

Much study has been given to the plans of handling the collection and the records. As a project of this nature grows, changes become increasingly expensive in time and cost of supplies. A search for the best methods of housing, labelling and handling large insect collections and of keeping survey records, with a view to bringing the plan of procedure to its highest efficiency and usefulness was made. New equipment and plans were evolved from this study and from the previous experiences. With the hope that it may be of interest and help to others, some plans that are in use elsewhere together with the methods followed by the Iowa Survey Collection are given. Many of the facts presented have been gleaned by visiting or corresponding with a good number of the outstanding insect collections of our country.

CABINETS

Correct housing calls for accessibility of the collection and protection from insect pests, dust, and light. Some still use wood cabinets, but cabinets of steel holding from 12 to 60 cases or drawers are most largely used. The Iowa Survey cabinets are of steel. Each cabinet holds 48 drawers, which are in two columns. The four doors are hung on split hinges which permit their easy removal when considerable work is being done on the drawers. The door openings are lined with poison impregnated felt to make them practically dust and pest proof. The doors have individual locks on the handles which are master-keyed.

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CASES

The preference in cases runs to drawers of the "Cornell" or "U. S. National Museum" type or some similar glass topped pest proof case. Drawers with length and width about equal and around 18 or 19 inches seem to be preferred, though some find smaller drawers to better meet their requirements. The usual depth is from 2¼ to 3 inches. Drawers have bottoms of cork, balsa wood, or some other substance that will take and hold insect pins and are usually lined with white gazed paper. Where the unit tray sytem is used, pinning bottoms are not necessary. Some have incorporated a separate compartment for fumigants into the drawers. A drawer pull and label holder is desirable.

The Iowa Survey cases are made of bass wood and are finished with shellac and waxed. The outside dimensions are 16" x 19" x 2 11/16". The label holder and drawer pull is combined in one piece for neatness and simplicity. The usual hooks for holding the lid in place have been dispensed with, thus making the cases neater and more easily handled. The close fitting glide bars on the cabinets hold the drawer tops snugly in position.

UNIT TRAYS

A large majority of the collections investigated, use the unit tray plan for handling their specimens. Others are changing to the plan or express the hope that they can adopt it later. Some feel that it would not meet their needs. Unit trays permit keeping all the specimens of each species together and to arrange species in their logical order or any other desired arrangement without repinning. The trays offer greater protection to the specimens and keep broken parts associated with their own species. They improve the looks of a collection. Some objections have been raised to their cost, but this need not be a large item. These trays are open paper boxes with pinning bottoms and are wholly covered inside and out with white glazed paper.

From four to six sizes of trays are commonly used. They range in outside height measurements from 1¼ to 1⅝ inches, all of any one collection of course, being uniform in height. In width from side to side, they need to be just right to make four rather snug fitting rows in a drawer. If too tight, trouble and breakage of specimens are likely to result in putting them in and out. If too loose they make a poor appearance. What the Iowa Survey Collection calls its number four tray should be of such a size from front to back that two trays will snugly fill one row in the drawer, except that room should be left for a family label or block filler. Three other sizes of smaller trays are recommended. They are the same height and width from side to side as No. 4, but differ from it in length from front to back. No. 3 should be exactly ½ the length, No. 2, ¼ the length and No. 1, 1/6 the length of No. 4. Some collections use a half width tray of such dimensions that two of them set side by side would exactly fill the space occupied by a No. 1 tray. If the policy is to keep only small series of small insects, say 3 or 4 specimens, considerable economy of room could be had thus, otherwise there would be scant value to the half width tray. A still larger tray having the length of a No. 4 but twice its width is useful. Four of these No. 5 trays will fill a case.

Trays should be well made of good substantial material. They should be perfect rectangles and exact in size. The sides must be straight and rigid. Most trays have a cork or balsa wood block in the bottom for receiving the insect pins. The Iowa survey collection has been using pinning blocks of two thicknesses of soft, corrugated paper in its trays for a number of years. They have proven quite satisfactory and lessen the cost of the trays considerably. Whatever type of pinning bottom is used it should be put in the trays and then the inside lining of heavy white glazed paper applied.

At present prices, 16½ x 19 glass topped drawers with the necessary trays to fill them and high quality steel, pest-proof cabinets, all of good workmanship can be bought at the rate of from $6 to $7 per drawer. About half of this cost is for the drawers; the remainder dividing between the cabinets and the trays.

WHERE THE SPECIMENS COME FROM

By far the greater part of the specimens in the Iowa Survey Collection are gotten through regularly organized collecting trips visiting all parts of the state. A good number of the Iowa colleges and Junior colleges have helped in one way or another. Many valuable contributions have come from high school biology classes in the form of general collections made by the students, or special insects sent in for identification. A goodly number of amateur collectors, old and young, are helping with specimens and records. Another rather large source of help has been the boy scouts. Many of the scout camps of the different areas of the state have been visited. The scouts have given a day or two to collecting and studying insects. As many as 800 different species of insects have been gotten in one day from a camp region, and some rare species have been thus secured. All of these forms of cooperation on the parts of beginners are welcomed. The specimens furnish new records for the survey and the survey in turn is glad for an opportunity to help these young folks to a larger interest in the out of doors.

HOW THE SPECIES ARE HANDLED

The mounted insects assembled for the survey from the various sources are first distributed to orders and families into "pink" boxes. These boxes have a pink label on the right end with the order and family numbers, and the name of the family thus, XVII-3 *Pentatomidae*. These boxes are kept on edge on shelves in cabinets in their numerical order, so that any desired specimens may be readily located.

Families are then worked for the collection. Specimens are identified to species and a name label pinned on each specimen. The label bears the Genus, species, and authors names together with the catalog number of the species. The name of the person determining it and the year of determination are also marked on the label. On the specimens remaining after the first four, the scientific name is sometimes omitted and the determination is indicated by the catalog number only. The determiner, date of determination, and sex are still marked.

In planning an insect collection, some matters of policy must be worked out. One very important question is "what is to be the purpose of the collection and how large a series of specimens shall be kept for each species?" If he chose, one could mount and keep a thousand chinch bugs, all from one field, but for most purposes three or four specimens would do as well and save considerable

time, material, and space. Rather large series are kept by the Survey Collection because of the distribution studies being made. For each species it is attempting to get and include in the tray one specimen from every possible county and to see that every possible month is represented. A minimum series of twenty specimens is kept if they are to be had, even though they should all come from one county and month. Specimens needed for the collection are put in it and marked on the record cards. Specimens not needed for the collection have round green paper dots put on the pins to mark them as duplicates and are then pinned in the duplicate or "green" boxes. These boxes bear green labels with order and family numbers and name of family the same as the pink boxes and are kept in their numerical order on edge on shelves. These named duplicates are given to high school biology departments and others interested in them or discarded when they become too numerous.

LABELLING

Some reference has already been made to the labelling and arrangement of the survey collection. Some scheme that would permit any of the workers to find the specimens of any species and their distribution record quickly and easily and would also insure their being able to put them back in place where the next one could find them, with equal ease, was a necessity if the work was to continue. The orders of insects have had Roman numerals assigned to them. Families within each order are numbered in Arabic figures. These names of all orders and families at all likely to occur in Iowa have been arranged in one of the accepted natural sequences, and made the basis for arrangement of the collection and records. Thus XI-101 not only signifies the family Chrysomelidae of the Coleoptera, but at the same time shows its logical place in all of the collections and in the records.

To facilitate their use the same names and numbers have been alphabetically arranged. This list permits a worker to quickly determine the key number for a family with which he is not familiar.

CATALOG NUMBERS

Each species has its catalog number in Arabic figures. The numbers in existing catalogs such as Leng's Catalog of the Coleoptera of North America North of Mexico are used. With orders where no numbered catalog is extant, "catalog numbers" have been improvised. For instance "The Insects of New York" has been used to catalog the Hymenoptera and some other orders. The different species under each genus are numbered consecutively down the page. A few numbers are skipped between genera to permit writing in species not in the New York book and to assigning such new names the number next higher than the last one of the same genus. The number of the page with the hyphenated species number constitutes the catalog number. For example, the genus *Cryptus* of the family Ichneumonidae appears on page 931. Two other genera proceed it. The first species under this genus is number "21" and *Cryptus vinctus* coming third in order is number 23. Its catalog number is then 931-23. When a species is first put in the collection it is marked in the catalog. One can then tell when looking up a species in the catalog to get its number if he may expect to find its card in the files and its tray in the collection.

Each cabinet drawer has a brass label holder containing a 1⅛" x 2½" card with the order and family number marked with heavy lettering pens. A card is marked XI-2A+. The "XI-2" indicates that the drawer contains the family *Carabidae* of the order Coleoptera. The "A" tells that this is the first drawer containing *Carabidae* and the "+" indicates to the worker he may look for a drawer marked XI-2B also containing Carabids. If it has a + following the B, he looks for a C drawer and so on until the letter followed by a "-", then the following drawer will contain the beginning of family XI-3. A card marked $\frac{\text{XI-2 P-}}{4}$ indicates that the succeeding drawer will be marked XI-4A and start a new family. This numering scheme has been found easy to maintain, yet wholly adequate for quickly locating families or species and for returning drawers to their correct place in the cabinet. These simple labels may be readily changed to keep the labelling up to date with rapid expansion in the collection.

TRAY LABELS

Let us now transfer our attention to the inside of the drawer. It has already been indicated that the trays fill four rows running from back to front of the case. A labelling scheme was desired that will permit keeping these trays in their logical order. The tray labels have a double lined, red margin across the top and at each end. A single vertical line one inch from the left end divides the space into two parts. They are printed on white bristol board. A cut has been made which prints the labels in strips of six, which makes it easier to put the labels in the typewriter. Tray labels are typed near their top margin with the catalog number of the species in the space at the left. Immediately under this is the number of the order and of the family to which the species belongs. In the wider space to the right and on a line with the catalog number is typed the full scientific name and the author's name. Under this is room for the common name or some notation if it is desired. Small adhesive dots or stars of different colors may be employed to indicate types of food, economic relations, geographic distribution, etc. Trays are arranged in numerical order by the catalog number at the left. To keep these numbers plainly visible no specimens are pinned in front of the numbers in the first row of insects in the tray.

These tray labels stand on edge against the inside of the back of the tray and fully fill the space. They are held in place by tiny label pins which are stuck through the ends of the tray from the outside and extend inside far enough to hold the tray label, which is slipped in back of the pins. When the addition of more specimens to the collection demands a larger tray, the original tray label may be taken out of the old tray and put into the new one very easily. This is a distinct advantage over having tray labels pasted on the wall of the tray. Some collections stand two insect pins vertically in the corners of the tray to hold the tray label in place. The use of the tiny label pins placed horizontally as described, seems to be unique with the Iowa Survey Collection, but it is much neater in appearance than the other plan.

Since new or larger trays are being added to the drawers from time to time and since it is desired to always keep both trays and drawers in their logical order, it is well to leave some unused space in a drawer to take care of expansion.

It is a good plan to fill the drawers at first only about two thirds full of "live trays" (bearing specimens). All the unoccupied space in the drawer is then filled with empty trays turned upside down. After all the trays are in place, any smaller spaces are closed up with "filler blocks." These "filler blocks" are pieces of fine grain wood about 5/16" thick, 1½ inches wide and as long as the width of a row of trays. These blocks are covered on both sides and one edge with white glazed paper and are used in the collection with the paper-covered edge up.

FAMILY LABELS

A red border is printed on the glazed paper edge of some of these blocks. This edge is then lettered in bold letters in black ink with the number and name of the different families of insects. At the right end of the block the catalog number of the first species of the family listed in the catalog is recorded in smaller figures. These blocks are called "family labels" and are placed at the head of each family in the collection. The catalog number at the right helps to locate the correct place, for the family label. In like manner labels are made to designate the beginning of an order. These are numbered in Roman notation and the order name is lettered on a black margined red panel to make it stand out in contrast to the family labels.

Some collections also have somewhat similar labels to separate the genera, but this has not seemed desirable for the Iowa Survey Collection.

Ord. & Fam.	Catalog Number	Scientific Name
XXV-13	931-23	Cryptus vinctus (Say)

Order
Hymenoptera

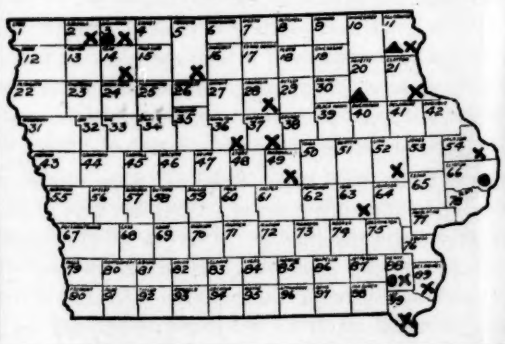
Family
Ichneumonidae

Habitat

Food

Jan	Feb.	Mar	Apr	May	June
				✓	✓

Jul	Aug	Sep	Oct	Nov	Dec
✓	✓				



Iowa Insect Survey

RECORD CARDS

The records play a very essential part in building the collection. They are kept on 3 x 5 white index cards as shown. (Fig.). Each species of insect known to occur in the state has its own record card. Since these cards are marked with order, family, and species numbers, the same as the tray labels, and filed in a steel case in numerical order, it is a simple matter to bring the tray

and the record card for any desired species together. At the head of the cards of each order in the files is a colored key card explaining the characters used in marking the records on the cards of that order. An x is placed in each county on the map for which a specimen of the species the card represents, is in the collection. Reliable lists of Iowa insects are similarly marked on the cards, but a different character is employed, and the character recorded on the key card. As opportunity is afforded the other insect collections of the state are also marked on the cards with a distinguished character. This shows the geographic distribution and many interesting facts and questions arise from these markings.

THE SEASONAL RECORDS

Of course some stage of every insect is to be had for every month of the year, else the species would become extinct. Some insects spend the greater part of their lives as eggs, and the time in which they assume the adult stage is comparatively short. A check mark is placed in the square of each month represented by a specimen in the collection, to show seasonal distribution of the adults of the species in question. Some other characters for the other stages could be used on the same squares for further valuable data.

Many species have now been so extensively studied that their record cards show very interesting distributional facts. From time to time new groups are given intensive consideration. It is apparent that this graphic system of portraying distribution has many advantages over the usual scheme of listing collection data.

LAPHRIA VULTUR OSTEN SACKEN AND TWO RELATED SPECIES (DIPTERA-ASILIDAE)

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Recently in checking material in the genus *Laphria* apparently two species were found under the name *vultur* Osten Sacken. Marston Bates kindly examined the types of *vultur* in the Museum of Comparative Zoology and, on verifying my observations, sent part of their material for study. Two of Osten Sacken's specimens (♂ ♀) are *vultur* and the third specimen is herein described as new, and notes on several other closely related species are given.*

Laphria vultur Osten Sacken

Laphria vultur Osten Sacken (in part), West. Dipt., 286, 1877.

"3. LAPHRIA VULTUR n. sp., ♂ ♀.—Whole body clothed with reddish-fulvous pile, especially dense on the abdomen; legs black; the black of the thorax as far as visible among the red pile has a bluish opalescent reflection. Length 15-20 mm.

"There is but little to add to this diagnosis. The abdomen, especially in the female, is much more slender than in *L. astur*. The front legs on their

*I am indebted to Marston Bates for examining the types in the Museum of Comparative Zoology, to C. T. Green, Division of Insect Indentification, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, for comparing specimens in the U. S. National Museum, and to the Museum of Comparative Zoology, the California Academy of Sciences, the Oregon State College, C. H. Martin, and Hugh B. Leech, for the loan of specimens.

hind side, sometimes also the middle legs are clothed with reddish-fulvous pile; much more in the male than in the female. The wings are hyaline on the proximal, infuscated on the distal half. Male forceps beset with reddish-fulvous pile.

"*Hab.*—The Woods of the Coast Range, above Santa Cruz, Cal., May 22; Webber Lake, Sierra Nevada, July 27. I received a specimen from Oregon from Mr. H. Edwards; two males and one female."

The above is Osten Sacken's original description. Mr. Bates has supplied the following data on the types: Male labeled "Oregon" and the female labeled "Webber Lake, Cal.", type No. 12841, Museum of Comparative Zoology.

Specimens are on hand from the following localities.

CALIF.: Giant Forest, VII-28 '29 (R. H. Beamer); Meadow Valley, Plumas County, elevation 3,500-7,000 feet, VI-12 to 24 '24 (E. C. Van Dyke).

OREG.: Alsea, V-23 '31 (H. A. Scullen); Hood River, VII-1 '17 (L. Childs); Marys Peak, VII-18 '14 (L. G. Gentner); Mt. Hood, elevation 3,000-4,000 feet, VI-24 '25 (E. C. Van Dyke).

WASH.: Bumping River, VIII-10 '24 (M. C. Lane); Mt. Adams, Yakima Ind. For. Res., elevation 3,000 feet, VI-30 '25 (E. C. Van Dyke); Mt. Rainier, White River Camp, VII-20 to IX-11 '32 to '35 (C. H. and D. Martin, S. E. Crumb, Jr., Itol. J. and J. Wilcox); Ranier National Forest, Pleasant Valley, IX-10 '35 (J. Wilcox); Signal Peak, 4,500 feet, VII-11 '26 (M. C. Lane), VII-15 '28 (K. C. Gibson), and VII-20 '33 (Paul M. Eide).

See note under *sackeni*.

Laphria sackeni n. sp.

Laphria vultur Osten Sacken (in part), West. Dipt., 286, 1877.
Laphria vultur Williston, Trans. Amer. Ent. Soc., XI, 29, 1883.
Laphria vultur McAtee, Ohio Jour. Sci., XIX, 151, 1918.

Male: Length 22 mm. Head with orange hairs and bristles except the following, which are black: A few hairs intermixed on the second joint of the palpi, above on the first antennal joint, on the entire second antennal joint, and on the sides below in the mystax, and a bristle below on the second antennal joint. Thorax orange haired except the mesonotum, which is largely short, fine, nearly erect, black pilose. Abdomen and genitalia entirely orange pilose. Hind legs black haired; middle legs largely black haired with some orange hairs below on the femora and tibiae; and the fore legs largely black haired, the femora with abundant long orange hair below and posteriorly and the tibiae below orange haired. Halteres yellow; wings brown, the cells posteriorly noticeably lighter in the middle.

Female: Length 20 mm. Similar. Palpi entirely orange haired, and only a few of the hairs on the second antennal joint, and above on the first joint, black.

Holotype: Male, Coast Range, Calif., May 22 (O. Sacken); type No. 19574, Museum of Comparative Zoology. Osten Sacken gives this locality as follows: "The woods of the Coast Range, above Santa Cruz, Cal., May 22;——."

Allotype: Female, Breitenbush, Oreg., VII-22 (J. Bequaert); type No. 19574, Museum of Comparative Zoology.

Paratypes: More than 75 specimens of both sexes from the following localities.

ALASKA: Skagway, Dewey Glacier, elevation 6,000 feet, VII-24 '23 (J. A. Kusche).

BRITISH COLUMBIA: Bon Accord, VII-7 to 11 '09 (N. Banks Coll.); Falkland, VI-4 '29 (Eric Hearle) Steelhead, VII-22 to VIII-7 '33 (Hugh B. Leech); Victoria VII-17 '01.

CALIF.: Carville, Trinity County, VI-29 '31 (E. C. Van Dyke); Meadow Valley, Plumas County, elevation 4,000-6,000 feet, VI-20 to VII-1 '24 (E. C. Van Dyke).

IDAHO: Long Valley, Alpha, V-27 to VI-24 '34 (C. H. and D. Martin); McCall, VI-22 '19 (M. M. Reeher).

MONT.: Big Fork, VI-29 '04.

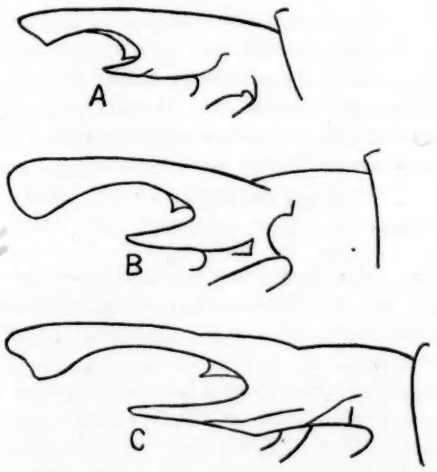

Figure. Lateral view of the right forceps and falcate process of *Laphria* species (X15): A, *Laphria vultur* Osten Sacken; B, *Laphria sackeni*, new species; C, *Laphria rapax* Osten Sacken. *Note*: The thornlike process arising from the ventral surface of the forceps just before the indentation between the forceps and the falcate process is not named or used in the discussion.

OREG.: Blue Mts., VII-15 '33 (G. P. Englehardt); Mt. Hood, elevation 3,000-6,000 feet, VIII-4 '25 (C. L. Fox); Mt. Hood, Cloud Cap Road, elevation 4,000 feet, VII-18 '33 (J. Wilcox); Mt. Jefferson, IX-8 '14 (W. J. Chamberlin); Newport, VIII-25 '29 (R. E. Dimick); Swim, elevation 3,500-4,500 feet, VIII-10 '28 (K. W. Gray); Waldport, VI-5 '25 (E. C. Van Dyke).

WASH.: Bumping River, VIII-10 '24 (M. C. Lane); Electron, VII-24 '34 (J. Wilcox); Greenwater, V-31 '31 (Wm. W. Baker); Mt. Baker, VIII-23 '31 (J. Wilcox); Mt. Ranier, VII-12 '31 (R. Latta); Mt. Ranier, Carbon River, elevation 2,500 feet, VIII-25 '32 (C. H. and D. Martin); Mt. Rainier Ipsut Creek Camp, VII-23 '35 (J. Wilcox); Mt. Rainier, White River Camp, VII-30 to IX-14 '32 to 35 (C. H. and D. Martin, Itol. J. and J. Wilcox); Olympia,

V-26 '32 (C. H. and D. Martin); Packwood Lake, VI-26 '29 (Paul Scheffer), VIII-27 '30 (S. E. Crumb), and IX-4 '32 (A. E. Bonn); Puyallup, V-26 '35 (J. Wilcox), and VI-9 '33 (Wm. W. Baker); Quinault, VII-26 '31 (H. T. Peters); Randle, IX-3 '32 (A. E. Bonn); Samish Lake, Whatcom County, IX-4 '29 (J. F. G. Clarke); Spanaway, V-29 '34 (J. Wilcox); and Sumner, VII-31 '32 (C. H. and D. Martin).

Williston says, "Ten specimens from Washington Territory, Oregon and California I identify with this, but, in all my specimens, the dorsum of the thorax across the middle is clothed with short black pile."

This is the species referred to as *vultur* by McAtee, Mr. Greene having compared specimens with McAtee's material in the U. S. National Museum. *Sackeni* differs in having the mesonotum largely short black pilose (entirely orange or yellowish in *vultur*); the hairs on the second joint of the palpi are usually entirely orange (in *vultur*, usually largely black); the fore and middle femora and tibiae are more extensively orange haired; and the male forceps are longer (see figures). Measuring from the apex of the seventh abdominal segment, the forceps of *sackeni* measure 3.19 mm. and of *vultur* 2.37 mm.; from the indentation between the forceps and the falcate process (in side view), the forceps of *sackeni* measure 1.74 mm. and of *vultur* 1.16 mm., and the falcate process of *sackeni* measure 0.60 mm. and *vultur* 0.29 mm. Some of the Idaho specimens have the mesonotum entirely fulvous haired.

Laphria rapax O. S.

Laphria rapax Osten Sacken, West. Dipt., 286, 1877.
Laphria rapax McAtee, Ohio. Jour. Sci., XIX, 159, 1918.

This species was described from a single male taken at Webber Lake, Sierra Nevada, Calif., July 28. McAtee does not include it in his key and places it next to *trux* McAtee in his discussion. It belongs to the *vultur* group; the female is described below.

Female: Length 19 mm. Black; hairs of the head black, on the sides and a few intermixed on the center of the face, and a few of the finer hairs below on the proboscis, whitish. Thorax and coxae black haired, the mesonotum behind the suture and extending slightly before the suture at the middle, the scutellum, and part of the hair of the fore coxae and propleura below, whitish. Abdomen orange haired, except the first two segments whitish haired, the long hairs apically on the eighth segment black, hairs on the ninth segment yellowish, and the venter largely black haired. Legs black haired. Wings brown, posterior cells lighter.

Described from a specimen in the writer's collection with the following data: Drake's Peak, Lake County, Oreg., elevation 8,300 feet, VII-25 '32 (D. K. Frewing). Additional specimens of both sexes are at hand from the following localities.

CALIF.: July (F. E. Blaisdell); Truckee, VI-15 '27 (Mrs. E. P. Van Duzee); Yosemite Valley, VII-12 '21 (E. C. Van Dyke).

OREG.: Bull Prairie, Lake County, elevation 7,000 feet, VII-24 '32 (D. K. Frewing).

WASH.: Signal Peak, Ranger Station, VII-3 '33 (C. H. and D. Martin).

Besides the differences in the coloration of the hairs of the head and

thorax, the spatulate forceps are longer than in either of the other species, measuring 3.77 mm. from apex of the seventh abdominal segment, and from the indentation between the forceps and the falcate process the forceps measure 1.94 mm. and the falcate process 0.87 mm. (See figure.)

This species is apparently closely related to *milvina* Bromley described from female specimens collected in British Columbia (Canad. Ent., LXI, 160, 1929), differing in the color of the hairs of the beard and the first two abdominal segments. A female specimen (Strawberry Mt., Grant County, Oreg., 8,600 feet, VIII-31 '32, D. K. Frewing) that I refer to *milvina* is much smaller (about 14 mm. long), has the mesonotum black pilose except very narrowly anteriorly and posteriorly, and the pleura and the four anterior coxae yellowish pilose.

AMERICAN SPECIES OF LUDIUS; THE SEMIVITTATUS AND NITIDULUS GROUPS (COLEOPTERA)*

BY W. J. BROWN,
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semivittatus group.

This group includes, besides *semivittatus* Say, *trivittatus* Lec., and the recently described *castanicolor* Fall, two species which have been confused with *semivittatus* and two others which have been identified as *fusculus* Lec. The species agree well among themselves in body form, type of sculpture, and type of aedeagus, and differ from each other mainly in characters of the antennae and vestiture and in color.

In most of the species, the apex of the apical abdominal segment bears a well developed brush of long, erect hairs, a structure not found in other sections of the genus. In *trivittatus* the hairs are shorter, and the brush is therefore less conspicuous. In *castanicolor* and *sexguttatus* the hairs are quite short, and the abdominal apex is scarcely different than in some distantly allied species which bear a few longer hairs on this part. The brush is evidently a male structure, as it is lacking in a single female of *semivittatus* which I have seen in the Ulke collection. This female differs from males also in having the body somewhat larger and more robust and the antennae distinctly shorter. I have seen no other females of species belonging to the group, and the following descriptions therefore apply to males only. Other characters of the group are as follows:

Body three times as long as wide or a trifle more elongate, moderately convex, a little more strongly so in the most elongate species; the elytra with the sides parallel in the most elongate species, feebly arcuate in the others but not distinctly dilated at apical two fifths. Vestiture consisting of fine, silvery hairs, distinct or conspicuous except in *castanicolor*. Antenna long or short, the second segment half or two-thirds as long as and subequal in width to the third; the third segment much narrower than the fourth; segments four to ten triangular, subequal in length. Head a trifle more than half as wide as the pronotum; moderately coarsely and very closely punctate; the front flattened, usually feebly depressed. Pronotum as long as wide in *trivittatus*, a trifle wider than long in

*Contribution from the Division of Systematic Entomology, Entomological Branch, Department of Agriculture, Ottawa.

the other species, feebly narrowed apically, the sides moderately arcuate; the punctures moderately coarse, not coarser on the sides, less close in *castanicolor* but quite constant in the other species, in them very close and separated by distances less great than their own diameters at middle, very dense but not confluent on the sides; the posterior angles moderately produced and divergent, strongly carinate. Elytra with the striae well impressed and rather strongly punctate; intervals finely and sparsely punctate in *castanicolor,* the punctures only moderately fine and quite numerous in other species. Prosternal sutures not excavated; the punctures of the prothorax beneath moderately coarse, much less close in *castanicolor* but in the others very close on the prosternum, very dense but separated by very narrow ridges on the propleura. Metasternum and abdomen closely, finely punctate; the punctures a little closer on the sides, less close throughout in *castanicolor.*

In connection with this group, three species which I have been unable to identify should be considered. Two of these, *oblongoguttatus* Mots. (1859, Bull. Soc. Mosc. XXXII, 373), described from California, and *tristis* Cand. (1863, Mem. Soc. Roy. Sci. Liege, XVII, 172), described from Vancouver Island, have been associated with *semivittatus.* It is certain that neither is identical with the latter. I believe, too, that *fusculus* Lec. (1863, Smiths. Misc. Coll. No. 140, 48) has been misidentified. This name was originally offered to replace the preoccupied name *angustulus* Mots. (1859, Bull. Soc. Mosc. XXXII, 373), based on specimens from Nova Helvetia, California. The specimen labelled *fusculus* in the Leconte collection, evidently considered the type of the species by Van Dyke, does not agree with Motschoulsky's description which calls for a depressed body, excavated prosternal sutures, and a combination of characters found only in *inflatus* Say and its closest allies. The Leconte specimen therefore can not be considered an example of Motschoulsky's species but seems rather a small example of the species described below as *deceptor* which, together with the species described below as *funereus,* was evidently considered *fusculus* by Van Dyke (1932, Proc. Cal. Ac. Sci. 4th ser. XX, 401, 428).

KEY TO MALES.

1. Elytra bicolored, black or brown and yellow 2
   Elytra black or brown, immaculate 5
2. Antenna short, just attaining the apex of the posterior pronotal angle, the intermediate segments not longer than wide .....1. *semivittatus* Say.
   Antenna longer, extending well beyond the apex of the posterior pronotal angle, the intermediate segments much longer than wide 3
3. Pronotum black, with a broad sublateral vitta on each side pale red .....
   .....4. *trivittatus* Lec.
   Pronotum entirely black 4
4. Third antennal segment equal in length to the fourth....2. *blanditus* n. sp.
   Third antennal segment distinctly shorter than the fourth.....
   .....3. *sexguttatus* n. sp.
5. Dorsum almost glabrous, dark reddish-brown; propleura polished, glabrous, the punctures well separated .....7. *castanicolor* Fall.

Dorsum with distinct vestiture, the pronotum and usually the elytra black; propleura distinctly hairy, very densely punctate..... 6

6. Antenna surpassing the posterior pronotal angle by a distance equal to the length of two and one-half segments.....5. *deceptor* n. sp.
Antenna just attaining the apex of the posterior pronotal angle.....
.....6. *funereus* n. sp.

1. **Ludius semivittatus** Say

Elater semivittatus Say, 1823, Jour. Ac. Nat. Sci. Phila. III, 174; Lec. ed. II, 113.

Length 9 mm.; width 3 mm. Rather feebly shining. Brown, the pronotum becoming reddish on the sides except at base, the legs somewhat paler and the head darker; elytron dull yellow, with the sutural interval and a humeral vitta brown; the latter occupying three intervals on the umbone, a little narrower apically, narrowly interrupted near its apex to form a small spot at the middle of the elytron. Vestiture very distinct throughout, less conspicuous on the elytra.

Antenna just attaining the apex of the posterior pronotal angle; the third segment two-fifths as wide as long, three-fifths as wide as the fourth; the fourth segment five-sixths as long as the third; segments four to ten each as wide as long, their outer angles not produced; the eleventh segment two-thirds as wide as long.

Abdomen with the apical brush of erect hairs well developed. Aedeagus as in *funereus*.

This description is based on a single specimen from Poudre River, Colo. The species is extremely rare in collections. The Leconte collection contains a single example labeled "Neb." which measures 11.5 mm. The Ulke collection contains seven specimens similarly labeled and one labeled "Dac." One of the Ulke specimens lacks the humeral vitta of the elytron; the others agree in color with the specimen described above. The species was originally described from "Missouri" and is evidently confined to the eastern flanks of the Rocky Mountains.

2. **Ludius blanditus** n. sp.

Length 11.5 mm.; width 3.5 mm. Form as in *semivittatus*; body rather feebly shining. Black, the antennae, legs, prosternal lobe, and apical abdominal segment dark brown; elytron dull yellow with a sutural, a sublateral, and a transverse vitta brown; the sutural vitta occupying the sutural interval, extending over the second and third intervals near the base; the sublateral vitta occupying four intervals near the humeral umbone, extending from base at the umbone to apex, narrow and faint just before and just behind the transverse vitta; the latter situated at middle of the elytron, dilated near the lateral margin; the markings not sharply delimited, somewhat darker near the base; vestiture very distinct, as in *semivittatus*.

Antenna surpassing the apex of the posterior pronotal angle by a distance equal to the length of two segments; the third segment two-fifths as wide as long, three-fifths as wide as and equal in length to the fourth; the intermediate segments with their outer angles not produced, scarcely narrower apically; the sixth segment three-fourths and the apical segment one-third as wide as long.

Abdomen with the apical brush of erect hairs well developed. Aedeagus

as figured, the lateral lobes parallel.

Holotype—♂, Ben Lomond, Calif., April 21, 1932, (L. W. Saylor); No. 3842 in the Canadian National Collection, Ottawa.

Paratypes—7 ♂, same data, April 21 and June 3, 1932, and April 20, 1931; 2 ♂, Santa Cruz, Calif., April 16, 1930 (H. E. Hinton and L. W. Saylor).

The paratypes vary from 10 to 12 mm. in length and show considerable variation in the color of the elytra. In two, the sublateral vitta is expanded so that the entire elytron is brown except for a spot extending from base to the transverse band on the fourth and a portion of the third intervals and a smaller elongate spot situated behind the middle. In most of the specimens, the sublateral vitta is broken to form an elongate spot at the humerus and another at the apex; the transverse vitta is then interrupted or reduced to a subcircular spot. I have studied the aedeagi of nine of the specimens and have observed no variation in the form of the lateral lobes which differ from those of the other species in their parallel form.

The species falls near *falsificus* Lec. in Van Dykes key. It is usually labeled *semivittatus* in collections.

3. **Ludius sexguttatus** n. sp.

Length 9.7 mm.; width 3.2 mm. Form as in *funereus;* body moderately shining. Black; the legs and antennae dark brown; a small, transverse, yellow spot on the propleura near base; elytron bright yellow with the sutural interval and three spots black; the sutural vitta not wider at base; the basal spot situated on the humeral umbone, occupying three intervals, two and one-half times as long as wide, separated from the median spot by a distance subequal to its own length; the median spot as wide as long, separated from the lateral margin by two intervals, from the sutural vitta by three intervals, and from the apical spot by a distance equal to its length; the apical spot twice as long as wide, its margins at its middle joined to the sutural vitta and the lateral margin, the spot projecting forward as a black angle on the yellow disk; the spots and vitta sharply limited. Vestiture distinct but not conspicuous, as in *funereus.*

Antenna surpassing the apex of the posterior pronotal angle by a distance equal to the length of two segments; the third segment half as wide as long, three-fifths as wide as and three-fourths as long as the fourth; the intermediate segments slightly narrower apically, their outer angles feebly produced as in *trivittatus*; the sixth segment three-fourths and the apical segment one-third as wide as long.

Abdomen with the apical brush not well developed, the hairs numerous and sub-erect but short. Aedeagus as figured, not elongate.

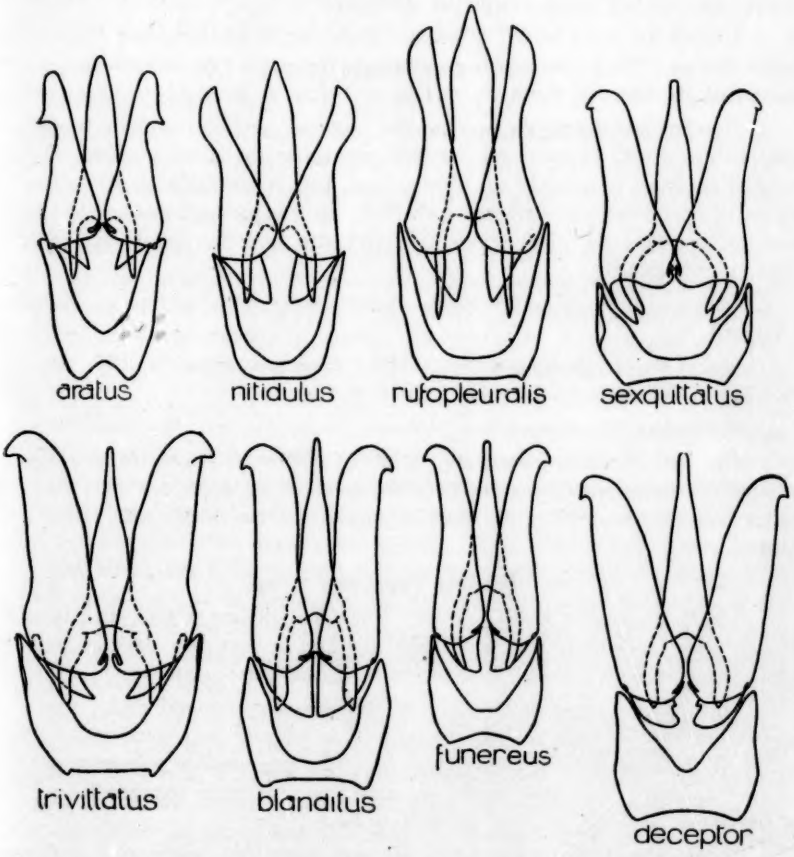
Holotype—♂, Medford, Ore., March 30, 1918, (L. G. Gentner); in the collection of the University of Wisconsin.

Paratype—1 ♂, same data, April, 1918; No. 3587 in the Canadian National Collection, Ottawa.

The paratype measures 10.3 mm. The colors are brighter and the vestiture is much less conspicuous than in *blanditus.*

4. **Ludius trivittatus** Lec.

Length 12-13.5 mm.; width 3.7-4 mm. Form as in *semivittatus*; body moderately shining. Head black; pronotum black, a broad, entire, sublateral vitta on each side pale red; elytron yellow with a sutural and a sublateral vitta black; the sutural vitta occupying two intervals, narrowed and confined to the sutural interval near the apex; the sublateral vitta occupying three or four intervals extending from base at the humeral umbone to apex, frequently narrowed or interrupted near the apex and before the middle; antennae brown to black; legs pale red to very dark brown; venter pale red, most of the prosternum and propleura and the metasternum at middle frequently brown. Vestiture very distinct throughout.



Antenna surpassing the apex of the posterior pronotal angle by a distance equal to the length of from two to three segments; the third segment half as wide as long, half as wide as and two-thirds as long as the fourth; the intermediate segments becoming narrow apically, their outer angles slightly produced and

very acute; the sixth segment seven-tenths and the apical segment one-fourth as wide as long.

Abdomen with the apical brush of erect hairs well developed but with the hairs somewhat shorter than in *semivittatus*. Aedeagus as figured, the lateral lobes wide, the median lobe rather short, the median struts strongly arcuate in one specimen.

The species was described from the "upper portions of the Southern States." The specimen bearing the name label in the Leconte collection is labeled "Ga."; it is evidently a cotype and is here designated lectotype. The above description is based on five specimens from Florence and Rocky Bottom, S.C., and Highlands, N.C.

5. **Ludius deceptor** n. sp.

Length 12 mm.; width 3.8 mm. Form as in *semivittatus*; body rather feebly shining. Black, the legs in part brown, the elytra very dark brown, almost black, with the hairs of the elytra as long and close as those of the pronotum.

Antenna surpassing the apex of the posterior pronotal angle by a distance equal to the length of two and one-half segments; the third segment one-half as wide as long, two-thirds as wide as and just measurably shorter than the fourth; the intermediate segments with their outer angles not produced, scarcely narrower apically; the sixth segment seven-tenths and the apical segment two-fifths as wide as long.

Abdomen with the apical brush of erect hairs well developed. Aedeagus as figured.

Holotype—♂, Walnut Creek, Calif., April 20, 1930, (L. W. Saylor); No. 3843 in the Canadian National Collection, Ottawa.

Paratype—1 ♂, same data.

The two specimens show no variation worthy of note. In this species the body is more elongate, the intermediate antennal segments are more elongate and the vestiture is much more conspicuous than in the others with immaculate elytra.

6. **Ludius funereus** n. sp.

Length 10.6 mm.; width 3.6 mm. Form a trifle less convex than in *semivittatus;* body moderately shining. Black, the legs in part very dark brown; the elytral epipleura pale brown. Vestiture distinct but not conspicuous.

Antenna just attaining the apex of the posterior pronotal angle; the third segment one-half as wide as long, two-thirds as wide as and equal in length to the fourth, the latter a trifle longer than the fifth; intermediate segments scarcely narrower apically, their outer angles not produced; the sixth segment four-fifths and the apical segment one-half as wide as long.

Abdomen with the apical brush of erect hairs well developed. Aedeagus as figured, as in *semivittatus,* as in *deceptor* but with the lateral lobes less parallel.

Holotype—♂, Summerland, B. C., May 13, 1933, (A. N. Gartrell); No. 3844, in the Canadian National Collection, Ottawa.

Paratypes—12 ♂, same data; 2 ♂, Douglas Lake, B.C., May 24 and 25, 1922, (E. R. Buckell); 6 ♂, Vernon, B. C., June, 1913, (W. H. Brittain); April, 1921 and May 10, 1928, (R. Hopping); May 29, 1908 and May 11, 1923; 1 ♂, Bridesville, B. C., May 31, 1924, (R. Hopping); 1 ♂, Keremeos, B. C., May 7, 1923, (P. N. Vroom); 2 ♂, Oliver, B. C., April 28, 1923, (C. B. Garrett) and May 15, 1929; 1 ♂, B. C.

The paratypes measure from 9.3 to 13 mm. in length; in several the elytra and the venter have a brownish cast. In this species, the body is less elongate and the vestiture is shorter, sparser, and much less conspicuous than in *deceptor*. The present species sometimes occurs with and resembles rather closely *pruininus* Horn. In the latter, the aedeagus is of a different type, the apical brush of the abdomen is lacking, the pronotum is fully as long as wide, and the punctures of the propleura are well separated by polished intervals.

7. **Ludius castanicolor** Fall.

Ludius castanicolor Fall, 1934, Jour. N. Y. Ent. Soc. XLII, 34.

Length 10.2 mm.; width 3.4 mm. Form as in *funereus;* rather strongly shining. Dorsum dark reddish-brown, the antennae, legs, and venter paler. Dorsum except the scutellum almost glabrous, the vestiture of the venter better developed but scarcely distinct.

Antennae failing to attain the apex of the posterior pronotal angle by a distance equal to the length of the terminal segment; the third segment one-half as wide as long, two-thirds as wide and just measurably longer than the fourth; intermediate segments scarcely narrower apically, their outer angles not prolonged; the sixth segment as wide as long, the apical segment one-half as wide as long.

Pronotum with the punctures separated by distances subequal to their own diameters except near the side margins. Punctures of the elytral intervals finer than in other species; punctures of the propleura well separated, the intervals between them flat and polished; punctures of the prosternum, metasternum and abdomen less close than in the other species. Abdomen with the apical brush not well developed, the hairs suberect and numerous but short. Aedeagus with the lateral lobes stout as in *trivittatus*, the median lobe extending as far as the apices of the lateral lobes, the median struts somewhat more slender and the basal piece longer than in *trivittatus*; the basal piece as long as wide and three-fourths as long as the lateral lobes.

The species was originally described from Jemez Springs, New Mexico. The description above is based on a single specimen from the same state. Although I have not seen the type, I do not doubt the identity of my specimen. The species differ from all of the others in color, in having the prothorax, both above and beneath, less closely punctate, and in having the vestiture very poorly developed.

nitidulus group

The three species included here differ from others in having the body broad, the dorsum black with a distinct aeneous lustre, and the prosternal sutures not excavated. They have been confused with each other and with the European *nigricornis* Panz. and have been characterized by Fall (1933, Bull. Brook. Ent.

Soc. XXVIII, 189) who has followed previous authors in placing *nitidulus* Lec. as a synonym of *nigricornis*. The group characters are as follows:

Body three times as long as wide, not distinctly dilated at apical two-fifths; black with distinct aeneous lustre, frequently marked with red as noted in the descriptions below; antennae usually brown; legs red or red and brown. Vestiture consisting of fine silvery hairs, very distinct; the hairs not or only very slightly closer on the scutellum than on adjacent parts.

Antenna slender, not surpassing the apex of the posterior pronotal angle; the second segment half or two-thirds as long as and subequal in width to the third; the third segment two-fifths as wide as long, seven-tenths as wide as and not shorter than the fourth; segments five to ten subequal in length, scarcely decreasing in width apically, elongate-triangular in form. Front flattened, not impressed. Pronotum as long as wide, its punctures not or very slightly coarser on the sides, the posterior angles moderately produced and divergent, strongly carinate. Elytral striae well impressed, the punctures of the intervals moderately coarse and close, almost as coarse as those of the striae, sometimes finer in *nitidulus*. Prosternal sutures not excavated; the punctures of the prothoracic venter moderately coarse, dense on the propleura. Metasternum and abdomen closely and finely punctate on the sides, the punctures less close at middle. Antennae sometimes slightly shorter in the female.

KEY TO SPECIES.

1. Propleura entirely red ..... 2. *rufopleuralis* Fall
   Propleura largely or entirely dark ..... 2.
2. Pronotal punctures fine, separated by distances equal to or greater than their own diameters on the sides. Length 9.3 to 10.2 mm..... 1. *nitidulus* Lec.
   Pronotal punctures moderately coarse, dense on the sides. Length 11 to 13 mm. ..... 3. *aratus* Lec.

1. **Ludius nitidulus** Lec.

Corymbites nitidulus Lec., 1853, Trans. Am. Philos. Soc. X, 439.

Length 9.3-10.2 mm.; width 3.1-3.5 mm. Body moderately convex.

Prosternal lobe frequently reddish in part. Antenna just attaining the apex of the posterior pronotal angle or failing to attain the apex by a distance equal to as much as half the length of the terminal segment, similar in the sexes; the third and fourth segments equal in length; the fifth segment nine-tenths as long as the fourth; the sixth segment three-fifths and the apical segment two-fifths as wide as long.

Head slightly more than half as wide as the pronotum, moderately coarsely, closely punctate. Pronotum with the sides feebly arcuate, more feebly so than in the other species, finely punctate; the punctures not or only slightly closer on the sides and there separated by distances equal to or greater than their own diameters. Propleuron with the punctures more or less confluent, moderately deeply emarginate at the base. Aedeagus as figured, the form as in *rufopleuralis* but with the lobes less elongate and with the lateral lobes less strongly rounded at base.

This species has been considered synonymous with the European *nigricornis* Panz. (*metallicus* Payk.); as noted below, the latter resembles *rufopleuralis*

more closely. The present species was described from Lake Superior. The specimen bearing the name label in the Leconte collection is evidently a cotype and is here designated lectotype for the species. Before me are twenty-eight specimens of *nitidulus* from Grand River, N. S.; Bathurst, N. B.; Laniel, Seven Islands, Natashkwan, Gaspe Co., Mt. Albert, and Cascapedia, Que.; Thunder Bay, Rainy River District, Sudbury and Biscotasing, Ont.; Aweme, Man., and Edmonton, Alta.

2. **Ludius rufopleuralis** Fall.

Ludius rufopleuralis Fall, 1933 Bull. Brook. Ent. Soc. XXVIII, 188.

Length 10.2-12 mm.; width 3.3-3.8 mm. Body moderately convex. Anterior and lateral pronotal margins very narrowly, prosternal lobe, propleura, elytral epipleura in basal half, and abdomen except at middle red. Antenna failing to attain the apex of the posterior pronotal angle by a distance equal to the length of one segment in the male, two segments in the female; the third and fourth segments equal in length; the fifth segment equal in length to or a trifle shorter than the fourth; the sixth segment two-thirds and the eleventh segment one-half as wide as long.

Head slightly more than half as wide as the pronotum, moderately coarsely, closely punctate. Pronotum with the sides moderately arcuate, moderately coarsely punctate; the punctures separated by distances subequal to their own diameters at middle, a little closer on the sides. Propleuron with the punctures usually not confluent except near the apex, the base feebly emarginate. Aedeagus as figured, the lobes more elongate and the lateral lobes more strongly rounded at base than in *nitidulus*.

The color of the species is quite characteristic and only by color is it readily distinguished from the European *nigricornis* Panz. The present species agrees with *nigricornis* in having the pronotal sides more strongly arcuate than in *nitidulus*, in having the propleura feebly emarginate on the base, and in pronotal sculpture.

It was described from Tyngsboro, Mass., and was recorded by Mr. Fall from Maine, New Hampshire, Detroit, Mich., and Montreal and Berthierville, Que. It is represented in the collection before me by nineteen specimens from Fredericton, N. B.; Ft. Coulonge, Kazabazua and Rigaud, Que.; Normandale, Go-Home Bay, Ottawa, and Kearney, Ont.; Winnipeg and Husavick, Man., and Escanaba, Mich.

3. **Ludius aratus** Lec.

Corymbites aratus Lec., 1853, Trans. Am. Philos. Soc. X, 438.

Length 11-13 mm.; width 3.8-4.8 mm. Body rather feebly convex, distinctly less strongly so than in the other species. Prosternal lobe, basal margins of the propleura, elytral epipleura near base, and sometimes the posterior pronotal angles more or less red. Antenna failing to attain the apex of the posterior pronotal angle by a distance equal to the length of from two to two and one-half segments in the male, from three to three and one-half segments in the female; the fourth segment nine-tenths as long as or (more rarely) equal in length to the third; the fifth segment four-fifths as long as the fourth; the sixth segment seven-tenths and the eleventh segment one-half as wide as long.

Head just half as wide as the pronotum, coarsely and densely punctate. Pronotum with the sides moderately strongly arcuate; the pronotal punctures

moderately coarse and separated by distances subequal to their own diameters at middle, a trifle coarser and dense but not confluent on the sides. Propleuron roughly sculptured, the punctures strongly confluent throughout, the base moderately deeply emarginate. Aedeagus as figured, the lateral lobes dentate.

The head is narrower and the pronotal sides are more closely punctate than in the other species. The specimen in the Leconte collection bearing the name label is evidently a cotype and is here designated lectotype for the species. The type locality is Lake Superior. The species is represented in the collection before me by nine specimens from Shelburne and Halifax, N. S.; Bathurst, N. B.; Carp, Biscotasing and Sudbury, Ont.

A NEW SCHIZOPYGA FROM CANADA (HYMENOP.: ICHNEUMONIDAE)*.

BY G. STUART WALLEY,
Ottawa, Ont.

Schizopyga pulchra n. sp.

Female.—Length 7 mm. Head thick antero-posteriorly, the temples scarcely narrowed behind, distinctly broader than eyes viewed dorsally; vertex evenly convex; ocelli small; ocellocular space fully three times diameter of lateral ocellus; malar space scarcely half basal width of mandible; face distinctly elevated above level of eye-margins, feebly shining with well separated fine punctures, the interspaces finely reticulately sculptured; antennae 23 segmented, first flagellar segment very nearly equal to second and third combined; thorax shining; propleura polished almost without punctures; mesoscutum with only sparse punctures bearing vestiture; mesopleura sparsely punctate above and polished impunctate behind, anteriorly and ventrally the punctures becoming more dense toward a patch of very fine dense punctures adjacent epicnemia; metapleura with larger shallow punctures which are somewhat confused by weak rugulae below; propodeum rather elongate, shining, impunctate, dorsally finely and faintly reticulate, median parallel longitudinal carinae very weak, lateral longitudinal carina distinct only on posterior half, apical transverse carina defined laterally but scarcely visible at middle; lateral face of propodeum a little roughened; nervulus slightly postfurcal, nervellus broken about at middle. Abdomen somewhat shining, impunctate, basal tergites finely granular, apically the tergites less granular and more nearly shagreened, sixth tergite and beyond without sculpture; first tergite three-fifths as broad at apex as long, lateral carinae well defined from base to apex, medianly a pair of weaker longitudinal carinae which are parallel except at base; sheath of ovipositor projecting slightly beyond apex of abdomen.

Head and thorax black; region of clypeus faintly reddish-brown; palpi stramineous; antennae pale brownish to brown apically, the basal segments also scape and pedicel a little paler below; tegulae and wing bases pale yellowish; stigma and veins brown, membrane faintly brownish; legs reddish, the front coxae and trochanters a little paler, extreme apices of all tarsi, extreme apex of middle

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*Contribution from the Division of Systematic Entomology, Entomological Branch, Department of Agriculture, Ottawa.

tibia, apices of hind femora except below, apices of hind tibiae rather broadly, black; first five segments of abdomen bright reddish remainder of abdomen black.

Holotype.— ♀, Moosonee, Ont., July 17, 1934, (G. S. Walley); No. 4061 in the Canadian National Collection, Ottawa, Ont.

Paratypes.— ♀, Stockton, Man., Aug. 25, 1925, (R. M. White); ♀, Morgan, N. J., Aug. 30 (Weiss and West). Paratype in United States National Museum.

Notes.—The two paratypes are very similar to the host. They differ slightly in having the median carina on the first abdominal tergite better defined than in the type.

The above species is at once distinguished from *S. frigida* Cress. by the bright reddish abdomen. In *frigida* the abdomen is entirely black. *Frigida* differs structurally in having the second abdominal tergite with fine longitudinal rugulae and shallow punctures and the ocellocular space distinctly less than twice the diameter of a lateral ocellus. Both species conform with the generic diagnosis given by Cushman (Proc. U. S. N. M., Vol. 60, Art. 4, p. 7, 1921).

BOOK NOTICES.

Insect Pests of Glasshouse Crops, by Herbert W. Miles, Ph.D. and Mary Miles, M.Sc. H. C. Long, Orchard Road, Hook, Surbiton, Surrey. 174 pages, XXI plates and 15 text figures. 9s. postpaid.

This volume is a well written account of the commoner pests, insects and otherwise, of greenhouse crops. The life histories of the various pests are given in sufficient detail for all practical purposes, together with control measures applicable under the specialized conditions of greenhouse work. Although based on European practises and pests, greenhouse conditions are so nearly uniform the world over that this book should be of value wherever greenhouse crops are grown.

The illustrations are original, the majority being good photographs, specially taken by the authors to illustrate this book.

The work is arranged in 9 chapters, the content of each of which is clearly indicated by the headings. The chapters are as follows:

I Glasshouse conditions in relation to the occurrence and control of Pests.
II General Soil Pests.
III Caterpillars and Leaf Miners.
IV Aphides, Capsids and Leaf-Hoppers.
V White Fly, Mealy Bugs and Scale Insects.
VI Thrips and Spider Mites.
VII Eelworm Pests.
VIII Woodlice, Earwigs, and Miscellaneous Pests.
IX Methods of Pest Control in Glasshouses.

There is an appendix in the form of an alphabetical list of the chief greenhouse crops, their pests and characteristic injury. There is also a selected bibiliography of 4 pages and an index of 13 pages.

Dictionary of Terms in Agriculture & Related Sciences, compiled by Professor T. J. Bessemer, State Agricultural Colege, Wagenigen, Holland, with twenty-nine collaborators. William & Wilkins Company, Baltimore, 1000+pages, $8.00.

This dictionary is probably the first of its kind in its field. It lists some 10,000 terms relating to Agriculture, Horticulture, Forestry, the Dairy Industry, and Apiculture, in the Dutch, French, English and German languages. A section of the book is devoted to each language. In each section the terms are listed in alphabetical order, followed by the equivalent term in each of the other three languages.

The compilers assume that the users, each in his own field, are familiar with the meanings of the terms. Accordingly no attempt is made to describe or define terms but every effort has been directed towards making the book a comprehensive and handy reference.

Although this book is not especially designed as an entomological reference and does not include many entomological terms, it should be of decided value to applied entomologists under the necessity of referring to foreign literature in general agriculture and related sciences. R. OZBURN.

An Abridged Catalogue of Certain Scutelleroidea (Plataspidae, Scutelleridae and Pentatomidae) of China, Chosen, Indo-China and Taiwan; by William E. Hoffmann. Lingnan University Science Bull. No. 7, Aug. 21, 1935, Canton, China, Price $ .50 Mexican.

The present catalogue is intended for use in conjunction with and as a regional supplement to Kirkaldy's "Catalogue of the Hemiptera, 1909." There are included 448 species and 32 varieties falling in 153 genera representing an increase of 86 species, 12 varieties and 11 genera not recorded by Kirkaldy. The genera are listed phylogenetically, following Kirkaldy, and the species in alphabetical order under each genus. In addition to synonymy and taxonomic references, the principal biological and economic literature is catalogued. An annotated bibliography of 540 titles is provided; also an appendix concerning the faunal subregions and a classification of the political areas and localities with a list of about 600 place names properly referred to their respective political and faunal subregions. G. S. W.

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